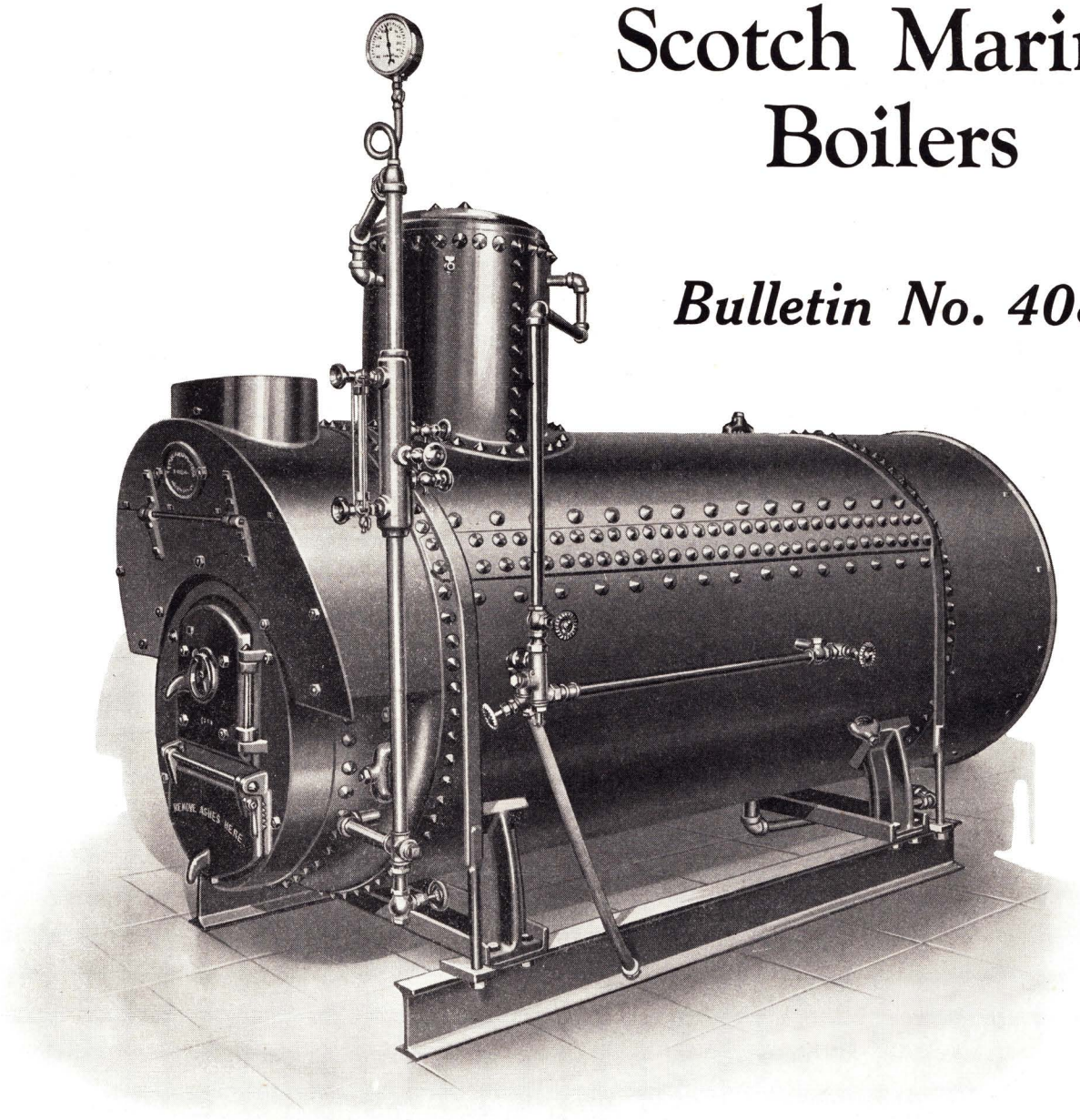
"O & S"
HIGH PRESSURE BOILERS

ORR & SEMBOWER, INC.
READING, PA., U.S.A.

"O & S"
Scotch Marine Boilers

Bulletin No. 408



Standard throughout the world. Built for Coal or Oil.

ORR & SEMBOWER, Inc.

READING, PENNA.

CHICAGO WAREHOUSE:
208-212 N. Clinton Street

ST. LOUIS WAREHOUSE:
419-429 S. Twelfth Street

NEW YORK EXPORT OFFICE:
50 Church Street

3500-4-10-30

"O & S" Scotch Marine Boiler

MATERIAL

The shell, heads and fire box are of the best quality open hearth homogeneous fire box steel boiler plate of not less than 55,000 lbs. and not over 65,000 lbs. tensil strength, guaranteed to bend double when cold. All material used, conforms to the Standard Specifications of the Association of American Steel Manufacturers. Rivets are of the best quality open hearth extra soft steel, and comply with the most rigid Physical and Chemical Properties analysis. All tubes are of the best quality.

BRACING

All braces, whether of thru or diagonal type, are made of weldless mild steel, and the size and number of same are based on allowing not more than 7,000 pounds of load per square inch of cross section of brace, and located so as to distribute the pressure as nearly equal as possible.

STANDARD CONSTRUCTION

All boilers built in accordance with our standard practice have the horizontal seam of shell, butt joint, double strapped, and double riveted. All girth seams are single riveted.

We have arranged for easy access to the combustion chamber for cleaning and inspection through a door in the rear. The combustion chamber is completely protected by fire brick.

Domes are furnished on all sizes up to and including 40 H.P. and the larger sizes with dry pipe instead of dome.

The Boiler is equipped with sufficient hand-holes so that it is easy to keep it free from sediment. There are three hand-holes in the front tube head, one above tubes, one on each side of the fire box flue below tubes and four in the shell as follows:—One in the bottom, one in the top and one on each side.

Openings 1¼" in size, and larger are reinforced with steel plate riveted around same, and both thicknesses of plate are threaded.

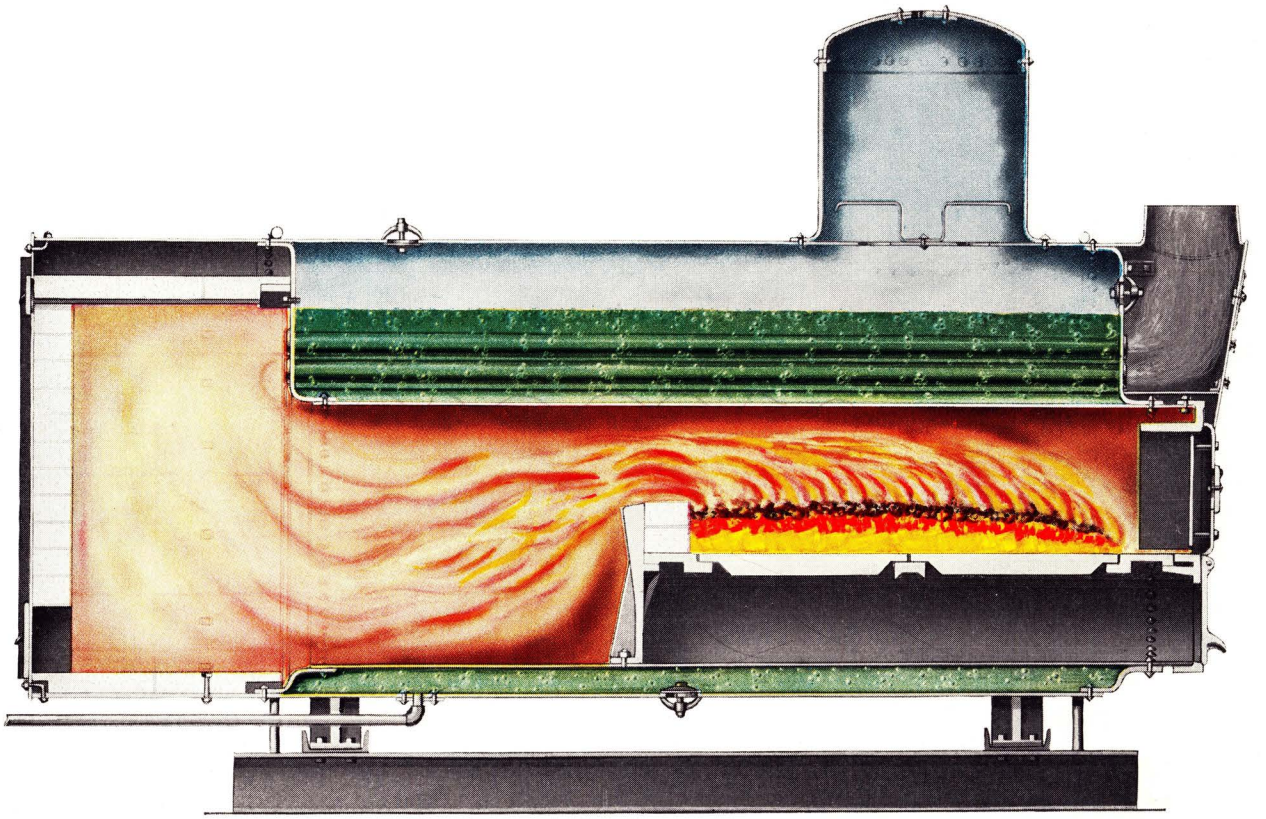
A fusible safety plug is located in the rear head above tubes.

INSPECTED AND TESTED

All boilers are rigidly tested and inspected at factory before shipment under hydrostatic pressure to one and one-half times the working pressure. A signed certificate of same, issued, by an authorized boiler inspector, will be gladly furnished upon request.

We are prepared to build these boilers to comply with the A. S. M. E. Boiler Code as well as all State and City Codes, and the Interprovincial Canadian Code.

All boilers are tested and made thoroughly tight under a hydrostatic pressure of 150 pounds and will pass for 100 pounds working pressure.



Sectional View Showing Construction

FITTINGS AND FIXTURES

The regular equipment includes front or breeching with smoke door and stack saddle, fire door and ash pit door with frame fitted to the front end of fire box, grate bars with bearers, bridge wall at back end of grate surface, pop safety valve, combination water column piped up to boiler and fitted with glass water gauge, steam gauge, with siphon and cock, gauge cocks, blow-off valve with elbow and pipe connected to boiler, injector with piping, globe, check and stop valves fitted to boiler, stack of length as per specifications, page 4 with guy wire four times length of stack and ash scraper.

Grates with bearers and bridge wall are regular equipment and are furnished unless otherwise ordered.

*On 50 H.P. and larger size boilers, the seamless corrugated furnaces are used.

For Complete Specifications see Page 4.

Specifications

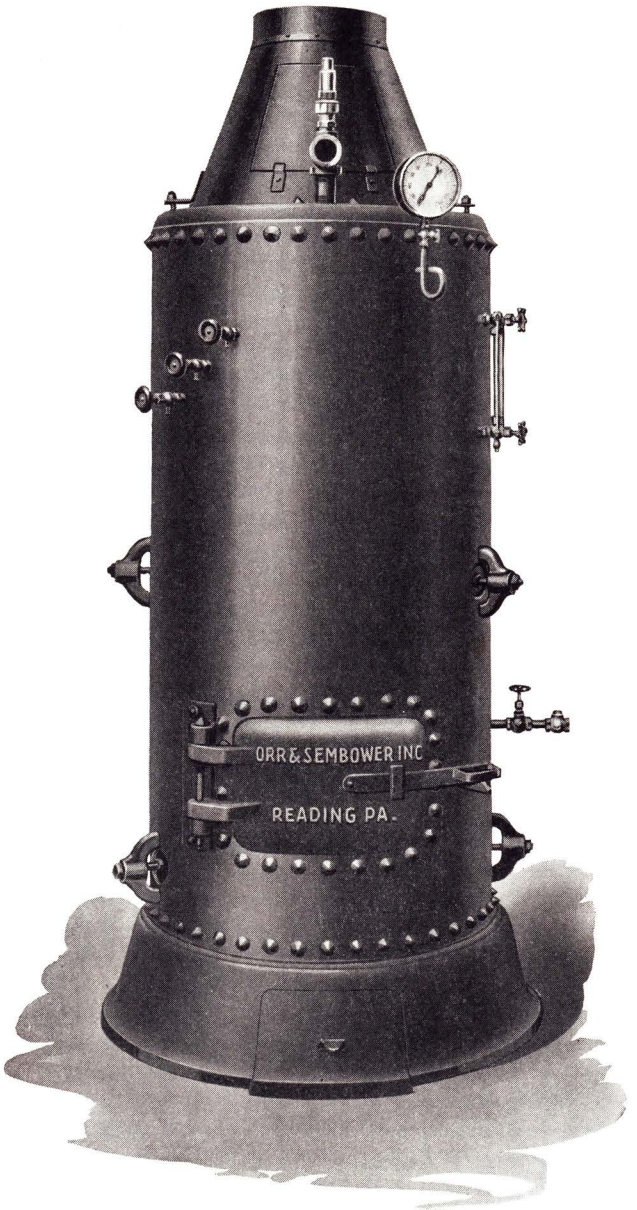
Horse-power	15	20	25	30	35	40	50*	60*	75*
Diameter of Shell, inches	46	46	48	53	56	60	66	72	72
Length of Shell, inches	99	112	113	115	115	119	142	137	148
Diameter of Firebox, inches	27	27	27	30	30	32	36	36	36
Length of Firebox, inches	73	86	86	86	86	89	114	109	120
Length of Grate Surface, inches	38	44	50	50	54	54	54	60	60
Thickness of Shell, inches	5/16	5/16	5/16	5/16	3/8	3/8	3/8	13/32	13/32
Thickness of Heads, inches	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2	1/2
Thickness of Fire box, inches	15/32	31/64	31/64	17/32	17/32	17/32	5/16	5/16	5/16
Number of Return Tubes	19	22	31	37	44	50	46	65	71
Diameter of Return Tubes, inches	3	3	3	3	3	3	3	3	3
Length of Return Tubes, inches	73	86	86	86	86	89	114	109	120
Square Feet of Heating Surface	138	176	220	263	300	348	427	520	645
Diameter of Dome, inches	19	19	22	22	22	25	...	...	...
Height of Dome, inches	21	21	24	24	24	28	...	...	...
Diameter of Smoke Stack, inches, by Length in feet	12″x20′	14″x25′	16″x30′	18″x30′	20″x30′	20″x30′	22″x40′	24″x40′	24″x50′
Height of Boiler over-all, inches	75	75	80	85	88	97	80	86	86
Width of Boiler over-all, inches	56	56	58	63	65	70	76	82	82
Length of Boiler over-all, inches	112	125	126	129	131	135	156	151	162
Approximate shipping weight on Skids with Fixtures, lbs.	6300	7000	8400	9500	10500	12000	14800	16600	17400
Approximate Weight of Complete Boiler, Crated for Export, lbs.	6800	7700	9400	10600	11700	13300	16100	18000	18900
Approximate Cubic Feet of Complete Boiler, with stack nested, Crated for Export	260	300	350	440	500	590	680	740	800
Code Name, O. & S. Standard	Corna	Coro	Coron	Crampo	Creo	Cranio	Crax	Crey	Criz
Code Name, A. S. M. E. Code	Corpu	Coru	Corsa	Cranda	Creso	Crapu	Crixm	Cryyo	Crizzo

*On 50 H.P. and larger size boilers, the seamless corrugated furnaces are used. These size boilers do not have domes, but are equipped with dry pipe. These specifications are for 100 pound pressure boilers, but are also built for 125 pounds pressure.

MILLER PRINTING AND LITHOGRAPHING CO., READING, PA.

Printed in U. S. A.

"O & S" Vertical Boilers



Full-Length-Tube Vertical Boiler
illustrating Round Base without Bottom

Standard Throughout the World

More than 50,000 *Satisfied Users*

REG. O&S MARK

Bulletin No. 529

ORR & SEMBOWER, Inc.

READING, PENNA.

Chicago Warehouse
208-212 N. Clinton Street

St. Louis Warehouse
419-429 S. 12th Street

New York Export Office
50 Church Street

5000--6-17-30

"O & S" Boilers have stood the test

Designed with a Mud Ring

—instead of O. G. flange which insures greater ease in cleaning out the boiler and corresponding longer life. The mud ring and fire door frame are made of electric steel and all rivet holes are drilled to templet.

Copper-Bearing Firebox Steel

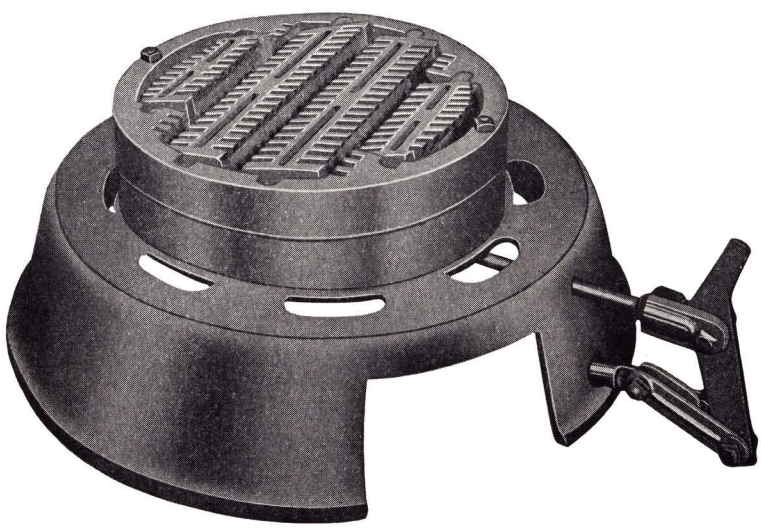
The steel plate used in these boilers is firebox quality, containing a sufficient quantity of copper to insure minimum corrosion, and manufactured to stand 55,000 lbs. tensile strength per square inch in accordance with A. S. M. E., and all other Boiler Code Specifications, including Massachusetts Standard.

Shaking Grate

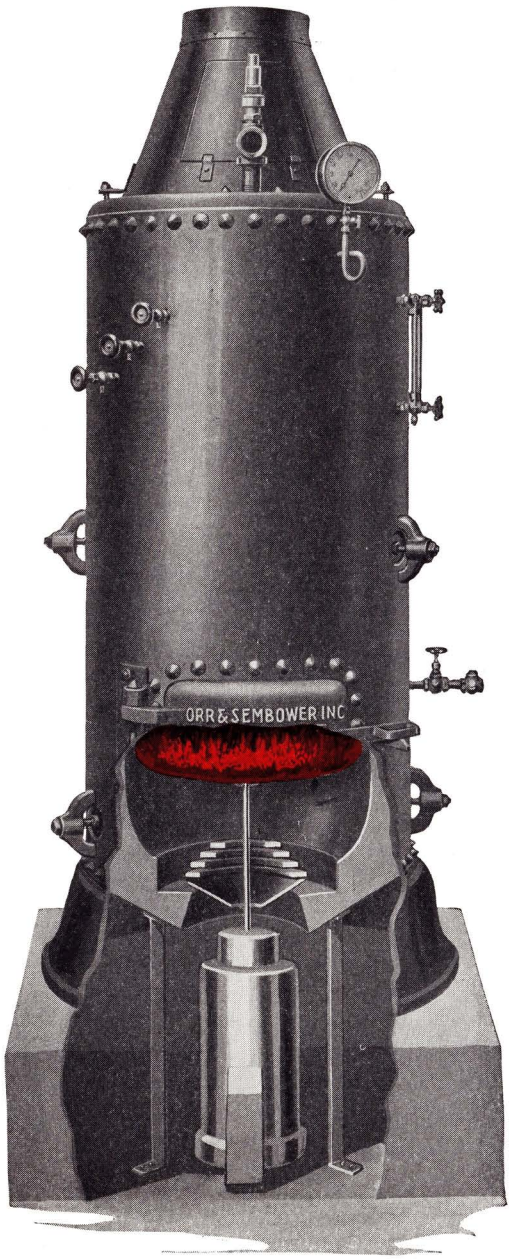
We are prepared to furnish the shaking grate for all boilers listed on page four of this bulletin. The air space is suitable for pea coal and larger sizes.

Standard Equipment

The majority of "O & S" boilers are equipped with heavy steel tubes, although charcoal-iron tubes can be furnished at an extra price. The standard equipment furnished consists of: Base, grate, hood, steam gauge, glass water gauge, gauge cocks, pop safety valve, blow-off valve, check and stop cock, fire door, hand hole plates and yokes, and fusible plug in one of the tubes. Injector, stack and shaking grates will be furnished with the order, at an extra price.



for nearly half a century - -



This reproduction illustrates one method of attaching an Oil Burner to the "O & S" Vertical Boiler.

Their Superiority

—in construction and in operation, has been acknowledged by users of this equipment. As a natural result, this Company has rightfully earned its good reputation for producing a quality boiler and giving satisfaction to its customers.

Used Throughout the World

You will find these boilers in every State in the Union, in all the possessions of the United States, and all civilized foreign countries.

Conforms with all Boiler Codes

They are built in sizes ranging from $1\frac{1}{2}$ to 80 H. P. inclusive. The standard boiler is designed for 100 lbs. working pressure and a large stock is carried in different points throughout the country to insure prompt shipments to our customers. Boilers to stand 125 lbs. working pressure can be furnished on special orders.

"O & S" Full-Length-Tube Vertical Boilers

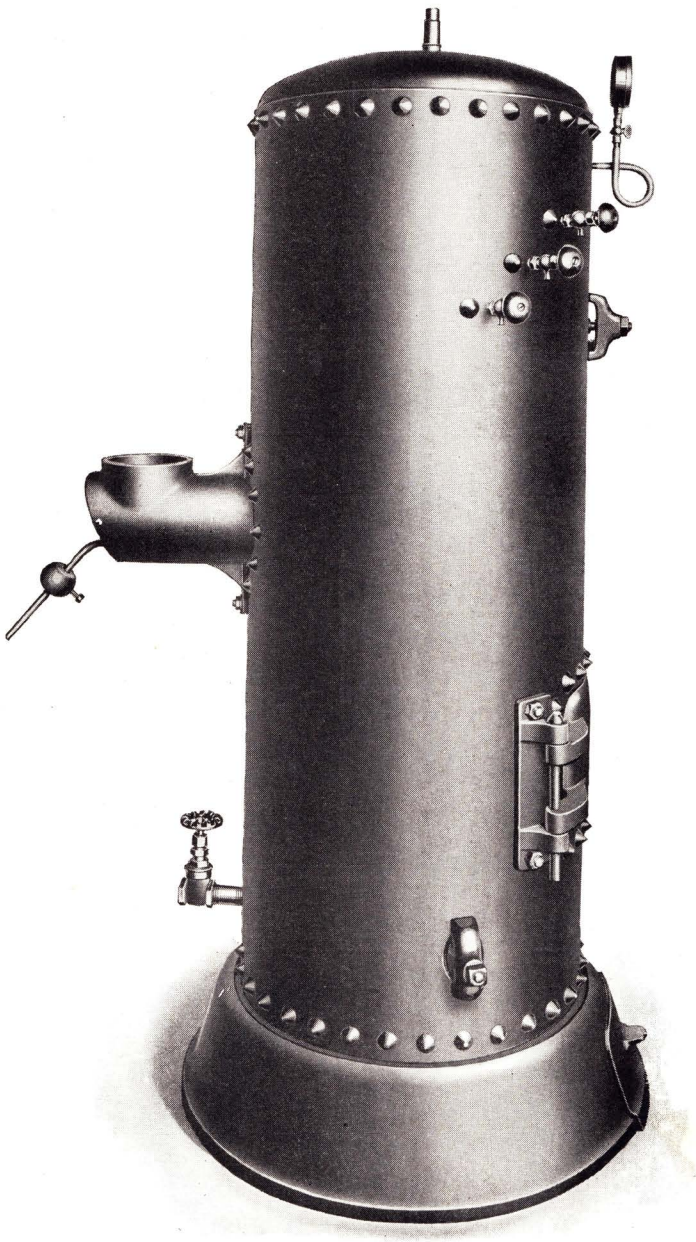
Specifications

Number	O	A	B	1	2	3	4	5
Horse Power	1½	2	3	4	5	6	8	10
Diameter of Boiler, inches	20	20	20	24	24	24	30	30
Height of Boiler, feet	3	3½	4	4	5	6	5	6
Diameter of Furnace, inches	16	16	16	19	19	19	24	24
Height of Furnace, inches	18	18	18	23	23	23	26	26
Thickness of Shell, inch	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Thickness of Heads, inch	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Thickness of Furnace Plate, inch	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
Number of Tubes (all 2 inches in diam.)	16	19	19	24	24	24	48	48
Length of Tubes, inches	18	24	30	25	37	49	34	46
Total Square Feet of Heating Surface	18	26	31	36	49	61	85	111
Square Feet of Water Heating Surface	15	21	25	29	41	52	63	89
Diameter of Stack, inches	8	8	8	8	8	8	12	12
Weight of Bare Boiler, approximate	540	590	640	800	940	1,055	1,385	1 605
Weight of Complete Boiler, approximate	730	780	830	1,110	1,250	1,365	1,855	2,065
Approximate Shipping Weight, crated for export, pounds	780	830	880	1,180	1,320	1,435	2,015	2,225
Approximate Cubic Feet, crated for export	20	21	22	27	31	35	57	64
Code Name, Standard Boiler	John	Jud	Jim	Joseph	Jonah	Joshua	Jacina	Jablon
Code Name, A. S. M. E. Boiler	Kaley	Kantner	Kahlan	Karbel	Kay	Keash	Keck	Keller
Code Name, Mass. Boiler	Laa	Lab	Labi	Laco	Lago	Lais	Lamel	Lami
Code Name, Canadian Boiler	Mac	Maca	Mach	Maci	Macu	Mada	Madre	Madu

Number	6	8	10	11	12	13	14	15
Horse Power	12	15	18	20	22	25	27	30
Diameter of Boiler, inches	30	36	36	36	42	42	42	42
Height of Boiler, feet	7	6	7	8	7	7½	8	8½
Diameter of Furnace, inches	24	30	30	30	36	36	36	36
Height of Furnace, inches	26	26	26	26	30	30	30	30
Thickness of Shell, inch	1/4	1/4	1/4	1/4	5/16	5/16	5/16	5/16
Thickness of Heads, inch	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Thickness of Furnace Plate, inch	5/16	5/16	5/16	5/16	11/32	11/32	11/32	11/32
Number of Tubes (all 2 inches in diam.)	48	72	72	72	92	92	92	92
Length of Tubes, inches	58	46	58	68	56	61	68	74
Total Square Feet of Heating Surface	136	165	201	232	252	272	299	324
Square Feet of Water Heating Surface	114	135	171	196	198	218	237	262
Diameter of Stack, inches	12	15	15	15	18	18	18	18
Weight of Bare Boiler, approximate	1,815	2,080	2,480	2,630	3,125	3,275	3,540	3,835
Weight of Complete Boiler, approximate	2,275	2,700	3,100	3,250	4,065	4,215	4,480	4,775
Approximate Shipping Weight, crated for export, pounds	2,435	2,880	3,280	3,430	4,285	4,435	4,700	4,995
Approximate Cubic Feet, crated for export	68	90	99	108	133	142	148	154
Code Name, Standard Boiler	Jaklic	Joyce	Jackson	Jamison	Jepsen	Johnson	Jeske	Jeffries
Code Name, A. S. M. E. Boiler	Kelly	Kenny	Kensil	Ketner	Kidd	Kibler	King	Klees
Code Name, Mass. Boiler	Lana	Lanc	Lando	Langu	Lani	Lanu	Lapi	Larc
Code Name, Canadian Boiler	Maec	Mael	Maen	Maes	Maf	Mag	Maga	Magu

Number	16	17	18	19	20	21	22
Horse Power	35	40	45	50	60	70	80
Diameter of Boiler, inches	42	48	48	48	54	54	54
Height of Boiler, feet	9½	8½	9	10	9	10	12
Diameter of Furnace, inches	36	42	42	42	48	48	48
Height of Furnace, inches	30	30	30	30	30	30	30
Thickness of Shell, inch	5/16	5/16	5/16	5/16	3/8	3/8	3/8
Thickness of Heads, inch	3/8	7/16 & 3/8	7/16 & 3/8	7/16 & 3/8	7/16	7/16	7/16
Thickness of Furnace Plate, inch	11/32	5/16	5/16	5/16	3/8	3/8	3/8
Number of Tubes (all 2 inches in diam.)	92	130	130	130	172	172	172
Length of Tubes, inches	85	74	80	90	77	90	114
Total Square Feet of Heating Surface	368	453	486	543	639	714	894
Square Feet of Water Heating Surface	306	369	408	459	509	584	764
Diameter of Stack, inches	18	20	20	20	24	24	24
Weight of Bare Boiler, approximate	4,050	4,765	5,000	5,425	7,200	7,700	8,700
Weight of Complete Boiler, approximate	4,990	5,890	6,125	6,550	8,800	9,300	10,300
Approximate Shipping Weight, crated for export, lbs.	5,210	6,240	6,475	6,900	9,300	9,800	10,800
Approximate Cubic Feet, crated for export	166	200	208	224	267	287	328
Code Name, Standard Boiler	Julian	Jucker	Jesberg	Jarrett	Janakis	Jordan	Juniper
Code Name, A. S. M. E. Boiler	Kline	Kling	Knight	Koch	Kohl	Kolb	Koons
Code Name, Mass. Boiler	Lare	Lary	Latel	Lathin	Latit	Lauda	Laug
Code Name, Canadian Boiler	Mah	Maha	Mahl	Maig	Maiz	Maje	Majo

"O & S" Vertical Tubeless Boilers



Bulletin No. 429

Designed with a mud ring instead of O. G. flange which insures greater ease in cleaning out the boiler and corresponding longer life. The mud ring, fire door frame and smoke outlet frame are made of electric steel and all rivet holes are drilled to templet.

ORR & SEMBOWER, Inc.

READING, PENNA.

CHICAGO WAREHOUSE
208-212 N. CLINTON STREET

ST. LOUIS WAREHOUSE
419-429 S. 12TH STREET

NEW YORK EXPORT OFFICE
50 CHURCH STREET

3500-4-10-30

Description and Equipment

THE TUBELESS TYPE BOILER is, in reality, based on the theory of the first boilers produced, at which time fuel economy was not considered. In later years, flues were placed in boilers to insure quicker action and corresponding saving in fuel per horse power. It has been determined, however, that in certain sections of the country, water conditions are unsatisfactory and cause a certain chemical action that destroys the metal in the tubes. This trouble seems to cause greater expense than the additional cost of fuel per horse power.

For this reason, the TUBELESS BOILER was produced although in determining the size boiler of this type to use on the job, it is necessary to remember the loss in efficiency, and that it will only produce about seventy per cent. of its rated horse power when steady operation is required.

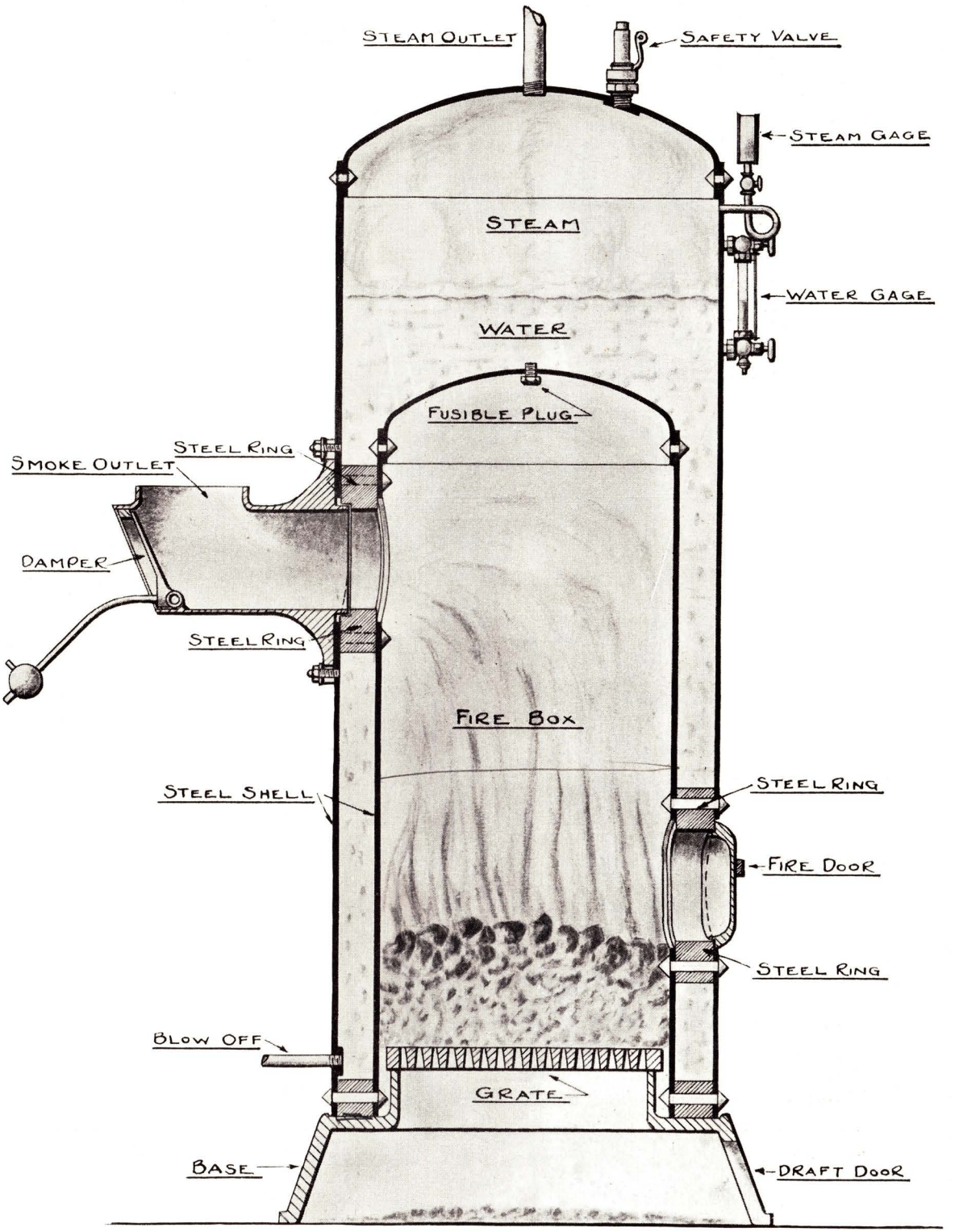
The steel plate used in these boilers is fire box quality, containing a sufficient quantity of copper to insure minimum corrosion, and manufactured to stand 55,000 lbs. tensile strength per square inch in accordance with A. S. M. E. and all other Boiler Code specifications including the Massachusetts Standard.

These boilers are designed for a safe working pressure of 100 lbs. and are required to stand a test of 150 lbs. minimum hydrostatic pressure.

A fusible plug is screwed into the center of the furnace head according to standard practice and illustrated on the sectional cut on page three of this Bulletin.

The Standard Equipment furnished consists of: Base, grate, steam gauge, glass water gauge, gauge cocks, pop safety valve, blow off valve, check and stop cock, fire door, hand hole plates and yokes, and smoke outlet with damper. Injector and stack will be furnished, when ordered, at an extra price.

The "O & S" Tubeless Boiler is the result of forty-three years of experience in the construction of high pressure boilers, and our customers may be assured of receiving "O & S" Quality, Service and Prompt Shipment on this as well as all other types of "O & S" Products.



Sectional View of "O & S" Vertical Tubeless Boiler

Special attention is called to the Electric Steel Mud Ring, Door Frame and Smoke Outlet Frame. This construction is not only the most modern, but is now admitted to be the most satisfactory of all types.

SPECIFICATIONS

"O & S" Vertical Tubeless Boiler

HORSE POWER	3	5	6½	8	10	12	15	20	25
Diameter of Boiler, Inches	24	24	24	30	30	36	36	42	42
Total Heighth, Inches	63	73	79	80	93	81¾	105¼	108	132
Depth of Ash Pit, Inches	7	7	7	8½	8½	9	9	11	11
Heighth of Boiler Only, Inches	56	66	72	71½	84½	72¾	96¼	96¼	120
Diameter of Fire Box, Inches	19½	19½	19½	24	24	30	30	36	36
Heighth of Fire Box, Inches	36½	44½	48½	49	58	48	67½	67½	84
Thickness of Shell Plate, Inches	1/4	1/4	1/4	1/4	1/4	1/4	1/4	5/16	5/16
Thickness of Fire Box Plate, Inches	5/16	5/16	5/16	11/32	11/32	7/16	7/16	1/2	17/32
Thickness of Shell Head, Inches	3/8	3/8	3/8	3/8	3/8	3/8	3/8	7/16	7/16
Thickness of Fire Box Head, Inches	3/8	3/8	3/8	3/8	3/8	7/16	7/16	1/2	1/2
Steam Outlet, Inches	1	1	1¼	1¼	1¼	1½	1½	2	2
Safety Valve Opening, Inches	1	1	1	1	1	1½	1½	2	2
Blow-Off Opening, Inches	1	1	1	1	1	1¼	1¼	1¼	1¼
Feed Water Opening, Inches	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4
Diameter of Smoke Outlet, Inches	6	6	6	8	8	10	10	12	12
Size of Fire Door, Heighth by Width, Inches	7½x10	7½x10	7½x10	9x11½	9x11½	9x13½	9x13½	10x15	10x15
Heighth of Low Water Line Above Floor, Inches	47½	55½	59½	61½	70½	61	80½	80½	99
Water Capacity at Low Water Line, Gals.	31	39	45	68	86	100	135	165	225
Approx. Shipping Wt., Complete, Lbs.	1190	1290	1360	1900	2100	2500	3000	3900	4400
Approx. Shipping Wt., Crated, For Export, Lbs.	1290	1390	1460	2050	2250	2700	3200	4200	4700
Approx. Cubic Feet, Crated for Export	31	35	38	64	70	100	110	140	150
Code Name, Standard Boiler	Vac	Vacca	Vacci	Vacil	Vacu	Vaga	Vagi	Vera	Velu
Code Name, A. S. M. E. Boiler	Vala	Valen	Valis	Valu	Vamo	Vana	Vand	Verd	Ven
Code Name, Mass. Boiler	Vanq	Van	Vant	Vap	Vari	Vati	Vect	Verm	Vena

MILLER PRINTING AND LITHOGRAPHING CO., READING, PA.

Printed in U.S.A.

"O & S" Steam Feed Cooker

Bulletin No. 228

THIS Feed Cooker was designed especially for farm use, such as cooking feed, steaming milk-cans and heating water, which is essential on the farm.

It is built of flange steel, is well riveted and calked and is tested under a pressure of 100 pounds, but should be used for low-pressure work only. The safety valve should be set to blow off at about 40 pounds.

The trimmings include: base, grate, hood, two gauge cocks, steam gauge, water gauge, blow-off valve, pump for supplying the boiler with water, safety valve, two and one-half feet of suction hose, three feet of steam pipe with valve for conveying the steam to the barrel or vat.

Always fill the boiler with water to the top gauge cock, but not above. Build a slow fire when firing up. If a quick, hot fire is built, there is danger of loosening the tubes in the top head before steam is generated.

Do not allow ashes to accumulate under the grate.

SPECIFICATIONS

Diameter of Boiler, inches	20
Height of Boiler, inches	44
Number of 2-inch Tubes	13
Length of Tubes, inches	30
Thickness of Shell, inch	3/16
Thickness of Heads, inch	5/16
Height Over All, inches	58
Weight Complete, pounds	550
Approximate Shipping Weight, crated for export, pounds	650
Approximate Cubic Feet, crated for export	21
Cipher Code Name	Katie

ORR & SEMBOWER, Inc.

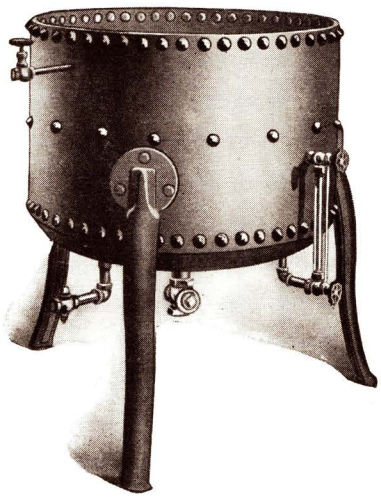
READING, PENNA.

CHICAGO WAREHOUSE:
208-212 N. Clinton Street

ST. LOUIS WAREHOUSE:
419-429 S. Twelfth Street

Printed in U. S. A.

Steam Jacketed Kettle



Bulletin No. 228

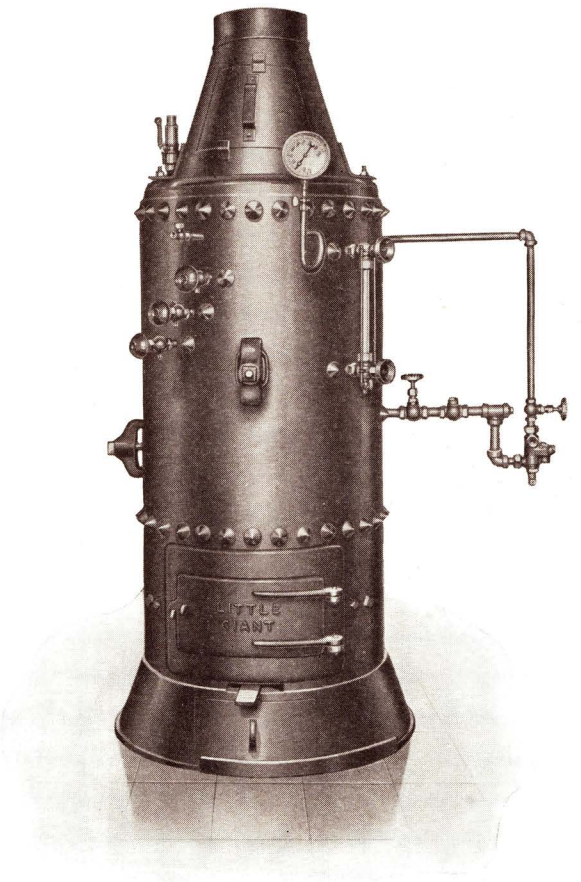
THIS reproduction illustrates our Steam Jacketed Kettle. It is built of boiler steel, is well riveted and calked, and given a hydrostatic test of 120 pounds.

The bottom and sides are jacketed, giving space for steam circulation.

The fittings comprise: Air valve, drip valve, legs, water gauge and stop cock for tapping.

SPECIFICATIONS

Capacity	25 Gal.	50 Gal.	75 Gal.	100 Gal.	150 Gal.	200 Gal.
Diameter Inside, inches	22	28	28	34	38	44
Diameter Outside, inches	26	33	33	39	43	49
Depth Inside, inches	21½	23	33	31	34¼	37
Height from Floor to Bottom of Kettle, inches	18	16½	14½	15	13¾	13
Height from Floor to Top of Kettle, inches	41	43	50	47½	50½	52½
Thickness of Shell, inch	3/16	3/16	3/16	¼	¼	5/16
Thickness of Heads, inch	¼	5/16	5/16	5/16	5/16	5/16
Approximate Shipping Weight, pounds	380	525	645	800	975	1,300
Approximate Shipping Weight, crated for export, pounds	440	650	800	1,000	1,225	1,525
Approximate Cubic Feet, crated for export	12	26	33	39	54	77
Cipher Code Name	Jep	Jenu	Jennie	Jeros	Jenkins	Jester



"O & S" Dairy Boiler

A. S. M. E. Standard

Bulletin No. 226

THIS Dairy Boiler is designed especially for farm use such as cooking feed, steaming milk cans and heating water.

This boiler is built in accordance with the A. S. M. E. Code and good for one hundred pounds steam pressure and has been approved in all A. S. M. E. territories.

The trimmings include base, shaking grates, hood, safety valve, gauge cocks, steam gauge, water gauge, blow-off valve, check and stop valve, and injector with piping.

SPECIFICATIONS

Diameter of Boiler, inches	20
Height of Boiler, inches	40
Number of 2-inch Tubes	10
Length of Tubes, inches	26
Thickness of Shell, inch	¼
Thickness of Heads, inch	⅜
Height Over all, inches	59
Weight Complete, pounds	550
Code Name	Kathryn

ORR & SEMBOWER, Inc.

READING, PENNA.

CHICAGO WAREHOUSE:
208-212 N. Clinton Street

ST. LOUIS WAREHOUSE:
419-429 S. Twelfth Street

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